

Acta Medica Okayama

Volume 51, Issue 3

1997

Article 7

JUNE 1997

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Abstract

Sixty-seven trigger fingers of 58 idiopathic and hemodialysis patients were treated by percutaneous A1-pulley release technique. Severity of triggering was classified into five grades for treatment selection and prediction of possible results. Results were excellent in 41 fingers, good in 9, fair in 7, and poor in 10, requiring additional treatment. The results of the lower grades were better, and those of the higher grades were poor. Excellent or good results appeared to depend on the proper selection of the patients according to the grading system and confirmation of triggering disappearance just after the release. There were neither infections nor neuro-vascular deficits after treatment. Compared to conventional open release, this treatment was found to be more useful from the standpoints of ease and safety of the technique, and the patients' quick return to normal life.

KEYWORDS: trigger finger, percutaneous release, idiopathic, hemodialysis

*PMID: 9227795 [PubMed - indexed for MEDLINE]

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Percutaneous Release for Trigger Finger in Idiopathic and Hemodialysis Patients

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Sixty-seven trigger fingers of 58 idiopathic and hemodialysis patients were treated by percutaneous A1-pulley release technique. Severity of triggering was classified into five grades for treatment selection and prediction of possible results. Results were excellent in 41 fingers, good in 9, fair in 7, and poor in 10, requiring additional treatment. The results of the lower grades were better, and those of the higher grades were poor. Excellent or good results appeared to depend on the proper selection of the patients according to the grading system and confirmation of triggering disappearance just after the release. There were neither infections nor neuro-vascular deficits after treatment. Compared to conventional open release, this treatment was found to be more useful from the standpoints of ease and safety of the technique, and the patients' quick return to normal life.

Key words: trigger finger, percutaneous release, idiopathic, hemodialysis

T rigger finger is one of the common diseases of middle aged women who are seen as outpatients. When conservative therapy is not effective, alternative treatment including open surgery may be necessary. Percutaneous release (1) for this condition is an outpatient technique. The wound is only a pin prick, and care and follow-up duration are kept at a minimum, favorable not only to patients but also to the medical staff.

We have treated trigger finger of idiopathic and hemodialysis patients by percutaneous release since 1993. We evaluated the results, taking into preoperative consideration, clinical grading and pre-existing conditions. The important points of preoperative preparation and technique are reported here.

Materials and Methods

Between 1993 and 1995, 58 patients (67 fingers) underwent percutaneous release of the tendon sheath. These 58 patients (15 men and 43 women, from 39 to 86 years of age, average 57.1 years) consisted of 42 (46 fingers) idiopathic and 16 (21 fingers) hemodialysis patients. Follow-up period for each patient was from 3 to 25 months (average 5.4 months). Duration of illness was 1.5 to 23 months (average 3.6 months). Prior to their hospital visit, 8 cases had been treated by steroid injections.

Trigger fingers were classified into the following 5 grades: Grade 1: triggering (–), only tender or click; Grade 2: triggering (+), easily and actively correctable; Grade 3: triggering (+), actively correctable with difficulty; Grade 4: fixed but correctable by the other hand with triggering; and Grade 5: fixed and uncorrectable.

Grade 5 was further subdivided into a) flexion type (fixed in flexion position) and b) extension type (fixed in extension position). Grades 2–5 were selected for treatment by this method. The number of cases according to disease and grade are shown in Table 1.

Procedures were performed in the examination room using an 18G needle. The patient was put in a supine or decubitus position, whichever was more comfortable and easier for performing the operation. For the treatment of triggering thumb, the patient was laid in a decubitus position so that the palm surface of the thumb was facing toward the surgeon. Before disinfection, the midline of the finger and the triggering point was marked. The puncture point for each finger was decided and the synovial space of the tendon was infiltrated with 1% lidocaine. Then the depth between skin and sheath was

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Table 1 Numbers of patients according to diseases and grades

Grade	Idiopathic	Hemodialysis	Total
2	25	7	32
3	8	6	14
4	4	3	7
5a	6	2	8
5b	3	3	6
Total	46	21	67

confirmed.

A suitable puncture point is that just above the proximal entrance of the A1 pulley, which varies from finger to finger. From our experience with open surgery and cadaver studies, the entrance of the A1 pulley of the thumb lies a few mm proximal to the proximal crease. The point of the index finger lies 5mm distal to the proximal palmar crease, and the points of the other three fingers lie a few mm distal to distal palmar crease (Figs. 1, 2). It may be difficult to approach if the puncture point is far from the entrance because an 18 G needle is not long enough. The tip of the needle is inserted from the entrance of the A1 pulley and moved to the exit. The A1 pulley is cut from the dorsal side to the palmar to avoid tendon rupture. The hard fiber of the A1 pulley can be cut from the palmar side to the dorsal. Care must be taken not to swerve from the midline to prevent the neuro-vascular injury. Confirmation of successful release and disappearance of triggering must be made by both the surgeon and the patient during the operation.

When bleeding has stopped, the puncture site is bandaged. The patient removes the bandage after a few days. Complete release without difficulty was confirmed again after one week.

The results of the operation were evaluated according to residual clinical complaints and complications after surgery; excellent (no complaint), good (minor complaint), fair (major complaint or minor complication), poor (major complication or recurrence). The follow-up period ranged from 2 to 24 months (average 8.6 months). The results were analysed according to the preoperative grade and basic diseases.

Results

Forty-one fingers were graded excellent, 9 were good, 7 were fair, and 10 were poor. The triggering phenome-

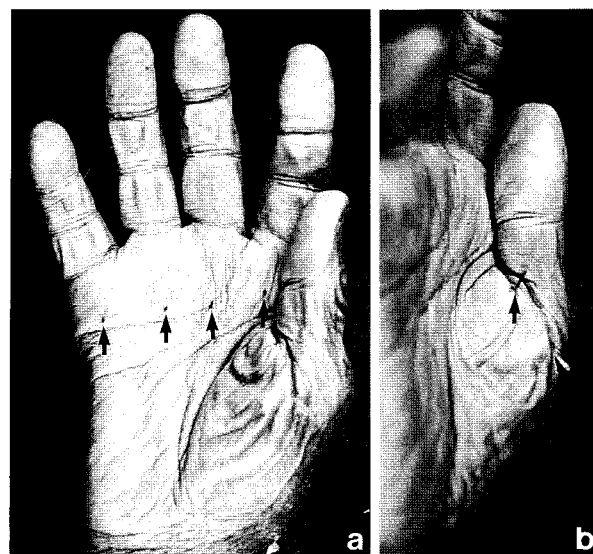


Fig. 1 Puncture points of cadaveric fingers before skin was detached. Black arrows show puncture points of the fingers (a) and thumb (b).

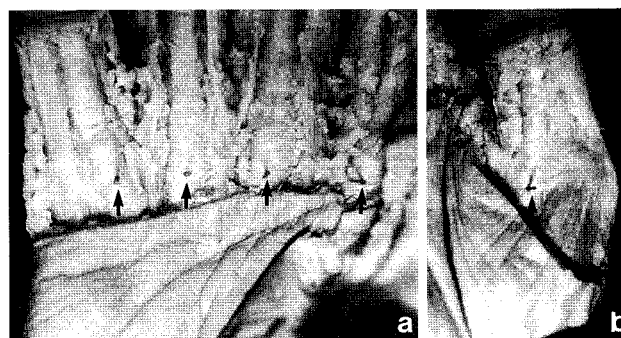


Fig. 2 Puncture points of cadaveric fingers after skin was detached. Black arrows show puncture points of the fingers (a) and thumb (b).

non disappeared in 85.1 % of the fingers after surgery. The low-grade cases showed better results than the high-grade cases. In 6 out of the 10 fingers with poor results, complete release was not confirmed just after the operation, and in 4, release was abandoned during the first operation. These cases were re-operated on by the same method ($n=2$) on another day with clear confirmation of no triggering or by open technique ($n=8$), and the final results of all re-operated cases were excellent. Seven out of the 10 poor fingers were Grades 4 and 5. Marked synovial proliferation were observed in all these cases during the following open method. In Grade 5b,

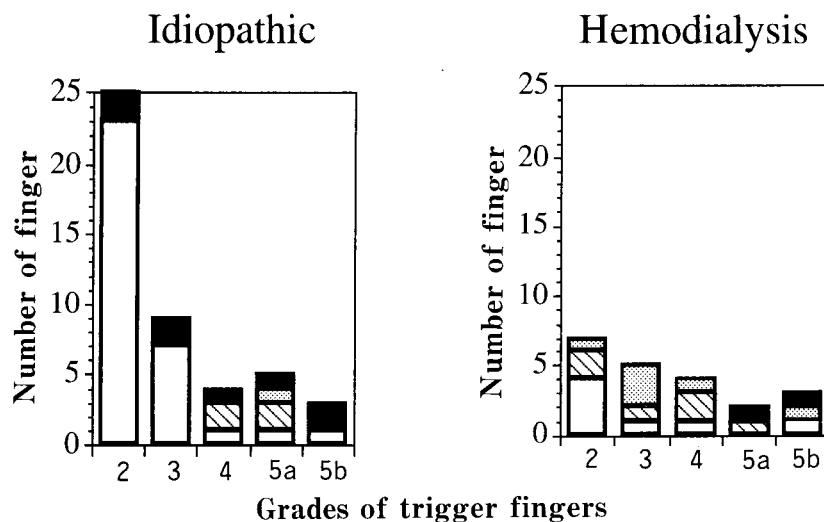


Fig. 3 Results of percutaneous release according to disease and grade. □ Excellent; ▨ Good; ▤ Fair; and ■ Poor.

increase of edema and synovium was revealed distal to the A1 pulley.

The success (excellent and good) rate of idiopathic patients was 78.0 %, while that of hemodialysis patients was 61.9 % (Fig. 3). Just after treatment, most patients complained of tenderness or motor pain in the finger. These complaints were more severe and longer lasting in hemodialysis patients.

There was no neuro-vascular injury or tendon rupture. However, in open re-operation, partial tears were seen more often in poor cases with high preoperative grade. The needle might have been advanced deeply many times cutting the sheath in these cases.

Discussion

The percutaneous release method, which was reported by Lorthioir (1), has made surgery in the consulting room possible, and facilitated postoperative treatment and an early return of the patient to normal life (2, 3). This method also guards against medical complication during treatment, especially against infection, for example hepatitis B or C. We do not use special instruments (4) but use an 18G needle for economical and safety reasons, thus reducing the burden of stress for both patients and medical staff.

Treatment by this method is chosen according to the degree of severity in Grades 2 to 5. However, in the case of Grade 2 or 3, the decision to operate can be made by

the patient when the duration of illness is short (within 1 month). Explanation about the operation, including post-operative treatment, efficacy of conservative therapy and the use of the open method, must also be given.

Triggering may disappear by local anesthesia in low-grade cases, so if palpation is neglected, triggering will recur. In early cases there were 7 fingers that were not palpated. For this reason, the triggering disappearance rate in our study (85.1 %) was lower than those of Eastwood (94 %) and David (91 %) (2, 3).

Quinnell (5) classified symptoms into four grades, but we divided them into 5 grades and Grade 5 was further subdivided into flexion and extension subgroups. We considered the condition of extension more severe than that of flexion. Grade 5b often accompanies edema around the A1 pulley and the triggering disappearance rate for this Grade was 33.3 %. This is the reason that we subdivided Grade 5 into flexion and extension types. Otherwise, another triggering point besides the A1 pulley has to be considered.

The success rate in hemodialysis patients was lower than that in idiopathic patients because the pain was more severe and lasting longer after surgery. We consider the reason for this to be inflammation caused by the procedure or subcutaneous bleeding. Amyloid deposits in the tendon sheath may also cause inflammation. These complications did not disturb normal daily activity life and gradually decreased, disappearing within 6 months. Considering the advantages of protecting the surgery room environ-

ment and staff against infection, this method should be chosen first for treatment of trigger finger in hemodialysis patients.

The disadvantages of this method are the following three points:

- a) Damage to the tendons and the neuro-vascular bundles because of a blind procedure, especially in the thumb and index finger in which the digital nerve lies near the A1 pulley (3, 6). David *et al.* (3) also stated that they did not perform this method on the thumb or index finger.
- b) Difficulty of direct confirmation of complete release.
- c) Difficulty of completing treatment for high-grade cases accompanied by proliferative synovium.

Following measures were taken to counteract these respective disadvantages:

- a) Marking of the midline, good operative position and correct puncture point selection should be made not to damage neuro-vascular bundles. When the swing direction of the needle is along the tendon, damage is negligible.
- b) Complete release has to be confirmed by the surgeon's palpation, and the patient should be asked to move the finger actively to make sure that the triggering has disappeared (7).
- c) It is necessary to explain the possibility of reoperation to each patient before the operation, and if the trigger condition does not disappear by percutaneous release, this method should be quickly abandoned before injury to

tendons, nerves and vessels occurs.

This method was found to be very useful from the standpoint of cost and safety, not only for the patients but also for the medical staff. Good results can be achieved by adequate preoperative patient selection, correct positioning of fingers and confirmation of the absence of triggering by both the patient and the doctor during the operation.

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Received October 16, 1996; accepted February 13, 1997.